



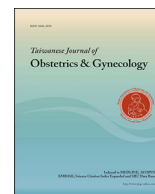
Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.



Contents lists available at ScienceDirect

Taiwanese Journal of Obstetrics & Gynecology

journal homepage: www.tjog-online.com

Correspondence

Potential implications of SARS-CoV-2 on pregnancy



Dear Editor,

The Wuhan Coronavirus (recently named SARS-CoV-2) has been making headline news around the world as there are over 60,000 confirmed cases and a total of over 1300 deaths in China alone since the start of the outbreak [1]. The World Health Organization has declared a global emergency as they are trying to control this outbreak. Over 28 countries and territories around the world has been affected but mainly in Asia.

The 21st century has brought us three novel coronavirus causing fatality on a large scale – SARS (severe acute respiratory syndrome) in 2003, MERS (Middle East respiratory syndrome) in 2012, and now the novel coronavirus from Wuhan [2]. As to date, there are only limited data on the consequences of this coronavirus on pregnancy. However, SARS and MERS are responsible for severe complications during pregnancy [3,4].

In a review of previous coronavirus infections in pregnancy, there were 13 cases of SARS-CoV and 11 cases of MERS-CoV reported in the literature [3,4]. Maternal outcome of the 13 cases: 4

cases had miscarriage, 2 opted for termination of pregnancy, 2 succumbed to SARS, 2 required mechanical ventilation, and 3 were treated conservatively. No neonatal adverse effect was noted except for 2 cases born prematurely – one at 28 weeks and the other at 26 weeks (Table 1). Maternal outcome of the 11 MERS-CoV cases: 2 were asymptomatic, 3 succumbed to MERS, 2 required mechanical ventilation, 3 were treated conservatively, and 1 refused treatment. No neonatal adverse effects were noted except for 2 intrauterine fetal demise (IUFD) (one at 38 weeks and the other at 20 weeks) and 1 fetal death due to prematurity at 24 weeks gestation (Table 2). The most important contributing factor for method of delivery in patients with SARS and MERS seems to be dependent on disease progression resulting in maternal hypoxia leading to fetal distress and prematurity. Neonatal infection due to possible vertical transmission was not detected in any of the SARS or MERS infection except for 1 SARS case in the United States where cord blood and breast milk were positive for the SARS-CoV antibody.

As human-to-human transmission exponentially increases, the number of pregnant cases will eventually surface. In light of the

Table 1
SARS infection and maternal–fetal outcome.

Country	Case	Maternal		Newborn		
		Complication	SARS-CoV Antibody	Delivery	Complication	SARS-CoV antibody
United States	1	Progressive Lung Infiltration s/p Mechanical Ventilation	Serum (+)	38 weeks Cesarean Placenta previa	No adverse effect	Cord blood (+) Placenta (–) Breast milk (+) Stool (–)
	2	Lung infiltration s/p antibiotics	Serum (+)	36 weeks Cesarean Fetal Distress	No adverse effect	Cord blood (–) Placenta (–) Breast milk (–) Stool (–)
Hong Kong	1	SARS fatality with MRSA pneumonia	Nasopharyngeal (+)	28 weeks Cesarean Fetal Distress	Necrotizing Enterocolitis with ileal perforation s/p laparotomy	Cord blood (–) Placenta (–) Stool (–) Peritoneal fluid (–)
	2	Lung infiltration s/p antibiotics	Stool (+) CSF (+) Peritoneal fluid (+)	26 weeks Cesarean Fetal Distress	Jejunal perforation s/p laparotomy	Cord blood (–) Placenta (–) Stool (–) Peritoneal fluid (–)
	3	SARS fatality	Stool (+)	32 weeks Cesarean Maternal Hypoxia	No adverse effect	Cord blood (–) Placenta (–) Stool (–)
	4	Lung infiltration s/p antibiotics	Nasopharyngeal (+)	33 weeks X Preterm labor	No adverse effect	Cord blood (–) Placenta (–) Stool (–)
	5	Progressive Lung Infiltration s/p Mechanical Ventilation	Stool (+)	37 weeks NSD	No adverse effect	Cord blood (–) Placenta (–) Stool (–)
Others		4 miscarriage 2 termination				

Table 2
MERS infection and maternal–fetal outcome.

Country	Cases	Maternal	MERS-CoV antibody	Newborn		
		Complication		Delivery	Complication	MERS-CoV antibody
Saudi Arabia	1	Asymptomatic	Nasopharyngeal (+)	Term NSD	No Adverse Effects	X
	2	Asymptomatic	Nasopharyngeal (+)	Term NSD	No Adverse Effects	X
	3	Lung infiltration s/p antibiotics	Nasopharyngeal (+)	34 weeks Induction	IUFD	X
	4	MERS Fatality	Nasopharyngeal (+)	38 weeks NSD	No Adverse Effects	X
	5	MERS Fatality	Nasopharyngeal (+)	24 weeks Cesarean	Preterm Expire	X
	6	Lung infiltration s/p antibiotics	Nasopharyngeal (+)	Maternal Hypoxia Term NSD	No Adverse Effect	X
	7	Progressive Lung Infiltration s/p Mechanical Ventilation	Nasopharyngeal (+)	Term NSD	No Adverse Effect	X
	8	Progressive Lung Infiltration s/p Mechanical Ventilation	Nasopharyngeal (+)	32 weeks Cesarean Maternal Hypoxia	No Adverse Effect	X
Jordan	1	Refuse treatment	EIA (+)	20 weeks Induction	IUFD	X
United Arab Emirates	1	MERS Fatality	Nasopharyngeal (–) RT-PCR (+)	32 weeks Cesarean Maternal Hypoxia	No Adverse Effects	X
South Korea	1	Lung infiltration s/p antibiotics	RT-PCR (+)	37 + 5 weeks Cesarean Placenta abruption	No Adverse Effects	Cord blood (–) Placenta (–)

new coronavirus (SARS-CoV-2) having similar pathogenic characteristics as SARS-CoV and MERS-CoV, pregnant women who become infected are at risk for adverse maternal and fetal complications [3,4]. Taking this into account, systemic screening of any suspected case is recommended and prompt referral to medical centers capable of handling and treating these cases is imperative.

Declaration of Competing Interest

The author declares no conflict of interest.

References

- [1] <https://www.worldometers.info/coronavirus/>.
- [2] Zhu N, Zhang D, Wang W, Li X, Yang B, Song J, et al. A novel coronavirus from patients with pneumonia in China, 2019. *N Engl J Med* 2020 Jan 24. <https://doi.org/10.1056/NEJMoa2001017> [Epub ahead of print].
- [3] Wong SF, Chow KM, Leung TN, Ng WF, Ng TK, Shek CC, et al. Pregnancy and perinatal outcomes of women with severe acute respiratory syndrome. *Am J Obstet Gynecol* 2004;191:292–7. <https://doi.org/10.1016/j.ajog.2003.11.019>.
- [4] Alfaraj SH, Al-Tawfiq JA, Memish ZA. Middle East Respiratory Syndrome Coronavirus (MERS-CoV) infection during pregnancy: report of two cases & review of the literature. *J Microbiol Immunol Infect* 2019;52:501–3.

Jen-Yu Tseng*

Department of Obstetrics and Gynecology, Taipei Veterans General Hospital, National Yang Ming University, School of Medicine, Taiwan

* Department of Obstetrics and Gynecology, Taipei Veterans General Hospital, No. 201 Shihpai Road Section 2, 112, Taipei, Taiwan. Fax: (02) 5570-2788.
E-mail address: albertotseng@hotmail.com.